MISCELLANEOUS NOTES

1. DENSITY AND DIET-DEPENDENT GROWTH RATES OF *BANDICOTA BENGALENSIS* UNDER LABORATORY CONDITIONS

(*With two text-figures*)

Although growth and development patterns of several species of rodents are known (e.g., Calhoun 1963, Jackson and Barbehenn 1962, Bentley and Taylor 1965, Spillett 1969), the effects of population density and diet on growth have not been recorded in terms of ecological growth rates. A preliminary study along these lines was carried out on the Indian mole rat (*Bandicota bengalensis* Gray) under laboratory conditions.

Pregnant females were captured in paddy (rice) fields by excavating burrows. The mothers and their litters (some of which were born during transfer) were placed in individual metal cages provided with nest boxes containing bedding material. Sufficient quantities of "rat and mice" feed (Hindustan Lever, India) and water were always present. The litter weight was taken (to the nearest 1 g) one month after birth and thereafter every ten days using a trible-beam balance. Thirty-day-old litters were separated into four size groups and fed on diets of rice (*Oryza sativa*) or ragi (*Eleusine coracana*) for 70 days (Fig. 1). Food eaten was expressed as grams consumed per 100 g body weight. The instantaneous coefficient of growth (ICG) rate of each litter was computed by slightly altering the following formula (Odum 1971).

$$r = \ln \frac{Nt - \ln No}{t} \quad \text{or} \quad \frac{dN}{N}$$

where the average rate of weight gain per organism per time replaced average weight of change in number of organisms per time per organism. The ICG rates at 21, 25, 30, 35, 40 and 45 days were plotted against litter density (Fig. 2).

The weights of the animals ranged from 16-22 g at the time of weaning (30 days) to 90-150 g at the end of experimental period (100 days). These figures on animal weights are quite close to Spillett's observations (1969) for this species.

The rates of solid food intake and growth were maximum after weaning but with in-

TABLE 1

WEIGHTS OF MALE AND FEMALE BANDICOOT RATS SUPPLIED WITH DIFFERENT FOODS

	Males				Females			
	No.	weight at 40 days (g)	weight at days (g)	80weight gain ( )	No.	weight at 40 days (g)	weight at 80 days (g)	weight gain
Group fed on rice	5	40 ± 8	93 ± 15	130	4	44 ± 6	77 ± 4	80
Group fed on ragi	1	31	112	261	1	47	127	157
Group fed on pellets	—	—	—	—	1	27	135	400

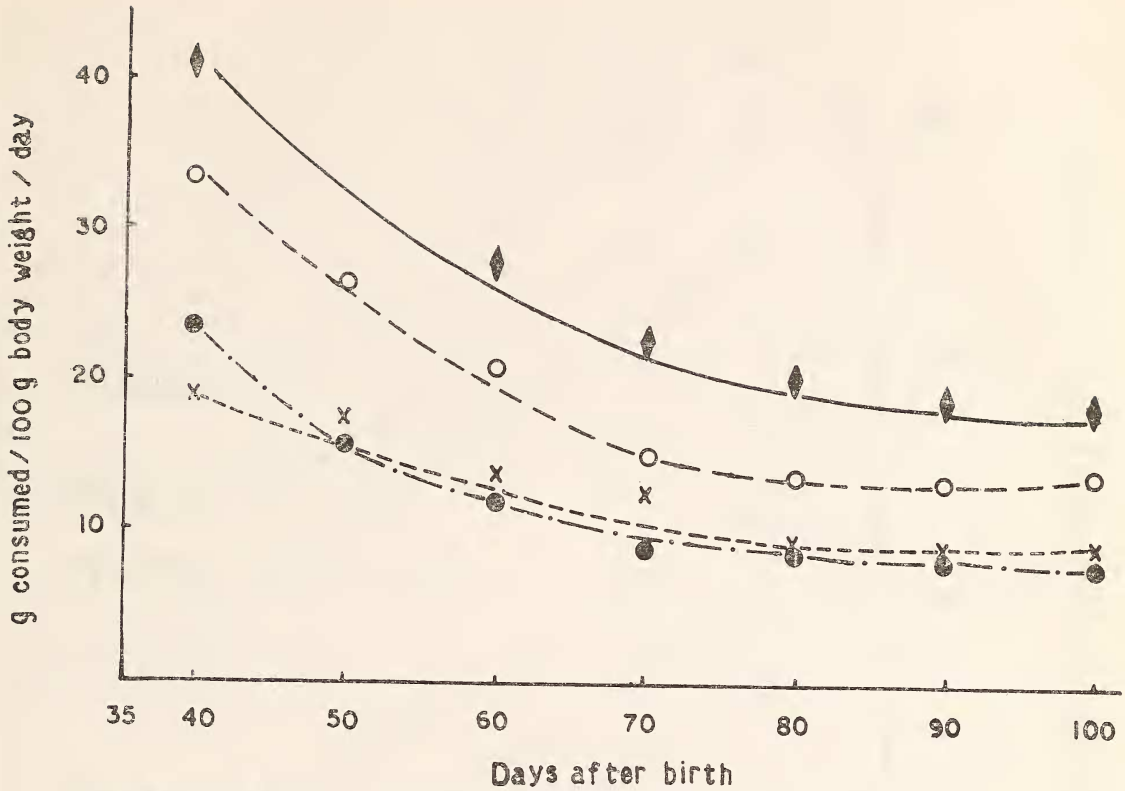

Fig. 1. Rate of food consumption of different density of *B. bengalensis* litters.
●——·——● 4 rats fed on rice
◆——◆ Single rat fed on rat feed
O—— —— —— O 2 rats fed on ragi
× — — — — × 5 rats fed on rice

creases in age declined (Figs. 1 and 2). No marked difference in the weight gain of two sexes was seen up to 40 days growth; but at 80 days, the rice-fed males were heavier than similarly reared females. Such a relation was not seen in ragi-fed group (Table 1).

Jackson and Barbehenn (1962) and Wirtz (1973) observed that older *Rattus exulans* females gained weight at a slower rate than males. Norway rats, too, exhibited large differences in mean weights between the sexes at 20 weeks of age (Calhoun 1963, and Hirata and Nass 1973). Bentley and Taylor (1965) reported similar differences between 35 and 42 days in *Rattus rattus*. Spillett's (1969) observations show that from birth to 30 days bandicot rat females grew faster, males gained weight more rapidly after 50 days. He also reported that adult males at 170-190 days in the wild weighed 225.5 g; females, 203 g.

Growth rates after 40 days are considered for discussion, since the period of transition from liquid to solid food is 25 to 40 days. Density of the litter inversely affected growth rates (Fig. 2), supporting the observations of McCance and Widdowson (1974). The growth

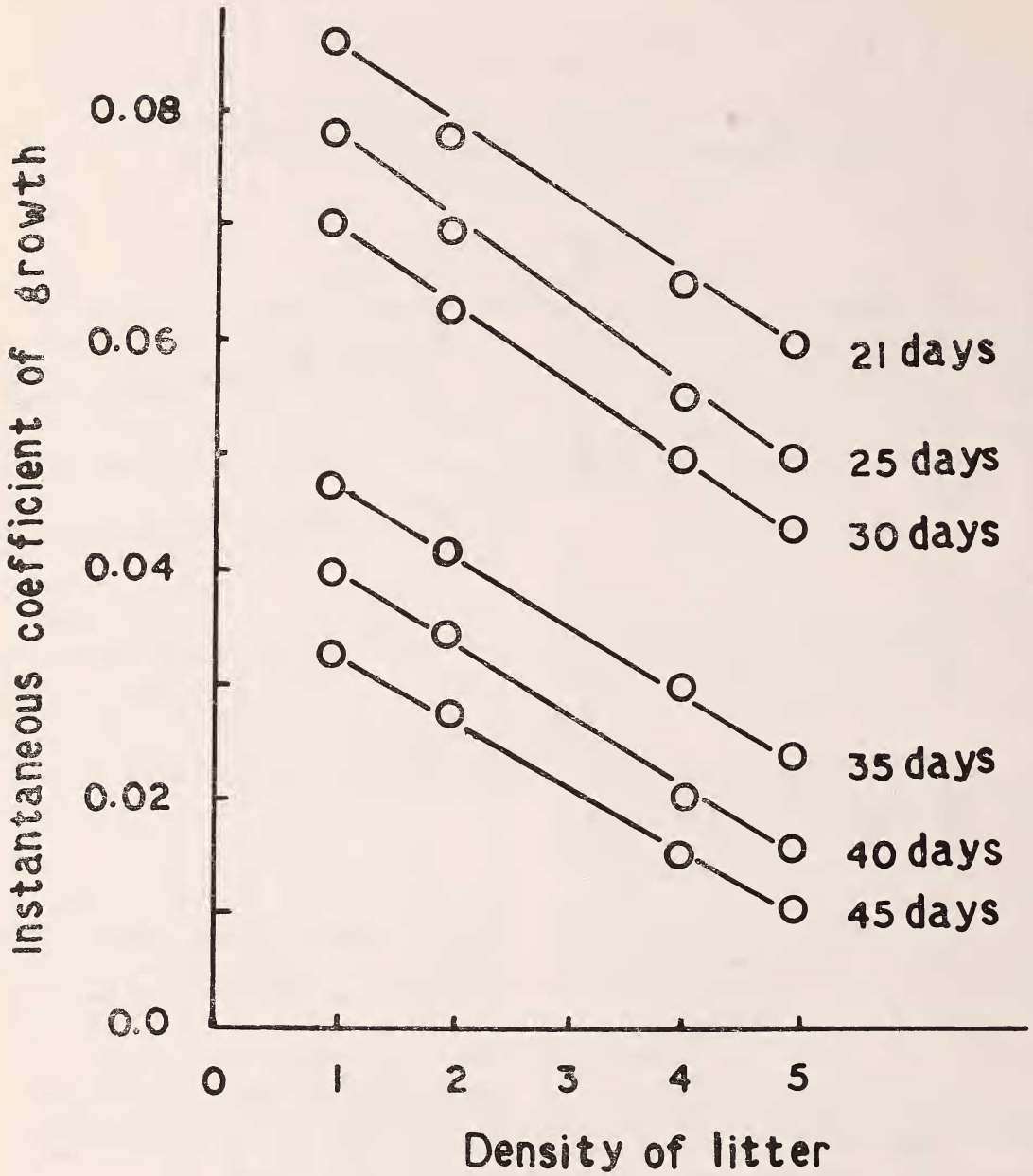

Fig. 2. Growth rates of different density litters of *B. bengalensis* at different periods of growth.

rate was greater in a non-competitive situation than in competitive conditions. Though Bentley and Taylor (1965) failed to establish a linear correlation between density of the litter and mean weight, they did observe that in 3 out of 4 comparisons the mean individual weight was greater in a smaller-sized litter at 28 days.

In addition to density, the diet also seemed to affect growth rates. The single rat was fed nutritionally balanced pellets and hence its greater growth. Ragi is more nutritious than rice (Aykroyd 1976); the litterlings fed on it showed a slightly higher rate of growth than those fed on rice. The number of animals used for the present study was quite small, but the general trend observed supports Jackson and Barbehenn's (1962) view that nutritional and environmental influences on size and maturation in rats are more important than genetic factors. Merely having animals in a cage with sufficient food under standard laboratory condtions does not insure uniform growth.

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